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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,211	06/17/2005	Ruiping Wang	040894-7265	2345
9629 7590 08/21/2007 MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004			EXAMINER HEVEY, JOHN A	
			ART UNIT 1709	PAPER NUMBER
			MAIL DATE 08/21/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/539,211

Applicant(s)

WANG ET AL.

Examiner

John A. Hevey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/17/05</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

2. Claims 1-2 are objected to because of the following informalities: claims refer to "a single-crystal particle". The specification teaches a plurality of particles, see Fig. 2. In light of the specification, these terms are interpreted for this examination as one or more particles and not a single particle. Appropriate correction is required.

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3. Claim 2 is objected to because of the following informalities: stated "a proportion" is confusing and indefinite. For the instant examination, the claim is interpreted as "the proportion." Appropriate correction is required.

4.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Riman et al. (US 7,022,303) in view of Wakino (US 5,441,657).

Claims 1 and 2 are drawn to a composite sheet comprising a matrix of a polyimide, silicone rubber, or epoxy resin and cubic lead zirconate titanate single-crystal particles dispersed within, wherein single-crystal particles possess (100) planes parallel

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to a plane of said sheet and which penetrate fully the plane of the sheet, and where single-crystal particles comprise 50-90% of the volume of said sheet.

Riman et al. (US 7,022,303) teaches a polycrystalline material comprising a plurality of single-crystal particles of lead zirconium titanate (claim 9) in cubic form (Claim 6) having self-orientation and bonded together to fix said orientation along at least one crystallographic direction (claim 1), wherein single-crystal particles are bonded together by a polymer phase (claim 12), wherein single-crystal particles are packed and aligned on the surface of a polymer film (claim 13) and where said single-crystal particles comprise greater than 65% of the volume of the material.

The claims differ from US 7,022,303 in that it fails to teach a polyimide, silicone rubber, or epoxy resin matrix material as a polymer binder, it also fails to distinctly specify the orientation of as having (100) planes parallel to a plane of the sheet. However,

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the material of Riman et al. (a polymer film, claim 12) with a polyimide, silicone rubber, or epoxy resin as taught by Wakino. Wakino discloses a vibration-isolating composite material comprised of inorganic elastic material and a synthetic polymer (claim 1) wherein the synthetic polymer is selected from a polyimide, silicone resin, epoxy resin, etc(claim 4).

One would have been motivated to make such a modification because the selection of materials such as polyimides, silicone rubbers, and epoxy resins for use in composite materials is well known in the art as taught by Wakino.

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Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the cubic single-crystal particles, self-oriented to the plane of the material found in Riman et al. would inherently possess (100) planes parallel to the plane of sheet as taught by the instant case (Wang et al.) which discloses in the specification "the face of each PZT single-crystal cube are composed of (100) planes."

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US4874727 drawn to a particulate lead titanate ceramic; US4917810 drawn to a piezoelectric composite material comprising microcrystals having virtually single domains and a polymer; US6761831, US09/844409, and US10/061605 drawn to composite materials with vibration-damping properties comprising piezoelectric materials; and US6037703 drawn to a pressure sensor comprising a flexible substrate and a piezoelectric element for detecting pressure.

Conclusion

1. No claim is allowed.
2. All pending claims are rejected.
3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. Hevey whose telephone number is 571-270-3594. The examiner can normally be reached on Monday - Friday 7:30 AM to 5:00 PM EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-270-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JAH

A handwritten signature in black ink, appearing to read 'Vickie Y. Kim', with a large, sweeping loop at the end.

VICKIE Y. KIM
SUPERVISORY PATENT EXAMINER